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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/624,175	07/22/2003	Lung Tran	200300753-1	6858
22879	7590	11/02/2004	EXAMINER	
HEWLETT PACKARD COMPANY P O BOX 272400, 3404 E. HARMONY ROAD INTELLECTUAL PROPERTY ADMINISTRATION FORT COLLINS, CO 80527-2400			NGUYEN, VAN THU T	
			ART UNIT	PAPER NUMBER
			2824	

DATE MAILED: 11/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/624,175

**Applicant(s)**

TRAN ET AL.

**Examiner**

VanThu Nguyen

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on 14 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 33-36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-21, 23-32 is/are rejected.
- 7) ☒ Claim(s) 7 and 22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 07/22/2003.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

1. Claims 33-36 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Group II, there being no allowable generic or linking claim.

Election was made without traverse in the reply filed on September 14, 2004. Applicants are required to cancel claims 33-36 in the next response.

2. Claims 1-32 are present for examination.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 9-10, 24-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 9, line 2, and claim 10, line 3, do applicant mean to say --on the substrate-- instead of "in the substrate"?

Same for claims 24-25.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this

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subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 5, 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Seyyedy et al. (U.S. Patent No. 6,754,124) or Freitag et al. (U.S. Patent No. 6,577,527).

Regarding claim 1, Seyyedy et al. disclose, in FIG. 1, a magnetic memory structure comprising:

a first group of magnetic tunnel junctions (group of MTJ on the left), the first group comprising a first group first layer (bottom layer on the left), the first layer comprising a first plurality of magnetic tunnel junction;

a first group second layer (next layer above bottom layer on the left) formed adjacent to the first layer, the second layer comprising a second plurality of magnetic tunnel junctions; and

a common first group conductor (34s and 32 on the left) connected to each of the first plurality of magnetic tunnel junction and the second plurality of magnetic tunnel junction.

Regarding claim 5, Seyyedy et al. further disclose, in FIG. 1, a second group of magnetic tunnel junctions (group of MTJ on the left), the second group comprising:

a second group first layer (bottom layer on the right), the second group first layer comprising a third plurality of magnetic tunnel junctions;

a second group second layer (next layer above bottom layer on the right) formed adjacent to the second group first layer, the second group second layer comprising a fourth plurality of magnetic tunnel junctions;

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a common second group conductor (34s and 32 on the right) connected to each of the third plurality of magnetic tunnel junctions and the fourth plurality of magnetic tunnel junctions.

Regarding claims 1 and 17, Freitag et al. disclose, in FIG. 4, a magnetic memory structure comprising:

a first group of magnetic tunnel junctions ( $1_1$ - $1_3$ ), the first group comprising a first group first layer, the first layer comprising a first plurality of magnetic tunnel junction;

a first group second layer ( $1_4$ - $1_6$ ) formed adjacent to the first layer, the second layer comprising a second plurality of magnetic tunnel junctions; and

a common first group conductor (WL1) connected to each of the first plurality of magnetic tunnel junction and the second plurality of magnetic tunnel junction;

wherein the first group first layer and the first group second layer are formed above and below the common first group conductor.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2-4, 6, 8-16, 18-21, 23-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seyyedy et al. in view of Nickel et al.(U.S. Patent No. 6,603,678) or Abraham et al. (U.S. Patent No. 6,724,674).

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Seyyedy et al. disclose, as applied in prior rejection of claim 1, all claimed subject matter except further limitations as in claims 2-3.

Regarding claims 2-3, Abraham et al. disclose, in FIGS. 5(a)-(b), a magnetic memory structure comprising a plurality of MTJ junctions, wherein each of the MTJ junction comprising a resistive/heater region.

Since Seyyedy et al. and Abraham et al. are both from the same field of endeavor, the purpose disclosed by Abraham et al. would have been recognized in the pertinent art of Seyyedy et al.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to include a resistive/heater region in each of the MTJ in order to assist selected MTJs in writing.

Regarding claims 2-4, Nickel et al. disclose, in FIGS. 4 and 5(b), a single layer comprising a plurality of MRAM cells, wherein each MRAM cell comprising a resistive/heater region (120b, see FIG. 4); and said plurality of MRAM cells on the same layer are heated when they are selected via transistor 132 (see FIG. 5(b)).

Since Seyyedy et al. and Nickel et al. are both from the same field of endeavor, the purpose disclosed by Nickel et al. would have been recognized in the pertinent art of Seyyedy et al.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to include a resistive/heater region in each of the MRAM cells in order to assist the selected MRAM cells in writing.

Regarding claim 6, see similar rejection regarding claim 3.

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Regarding claim 8, Nickel et al. also suggest that the heater regions are used to assist MRAM cells in writing.

Regarding claims 9-10, Seyyedy et al. disclose, in FIG. 1, all active devices that control selection/sensing of the MTJs are formed right above the substrate.

Regarding claims 11-12, Nickel et al. also disclose that with the thermal assist via heating the selected MRAM cells, less write current required.

Regarding claim 18, as shown in FIGS. 4 and 5(b) of Nickel et al., any current goes through the heating line 120 will heat up the MRAM cells and, at the same time, generate a magnetic field.

Regarding claims 13-16, Nickel also discloses row selected lines (116s), column selected lines (118s) and write enable selected lines (120).

Regarding claim 19-21, 23-32, they are rejected under U.S.C 103(a) because they claim similar subject matters as in claims 1-6, 8-18.

***Allowable Subject Matter***

9. Claims 7, 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowability:

The prior art made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations. Seyyedy et al., Abraham et al., Nickel et al., and Freitag et al., taken individually or in combination, do not teach the claimed invention having the first heater regions are turned on if the first and second pluralities of magnetic tunnel junctions

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are selected, and the second heater regions are turned on if the third and fourth magnetic tunnel junctions are selected, in combination with the remaining claimed limitations.

*Conclusion*

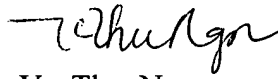
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to VanThu Nguyen whose telephone number is (571) 272-1881.

The examiner can normally be reached on Monday-Friday, 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on (571) 272-1869. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

VTN  
October 27, 2004

  
VanThu Nguyen  
Primary Examiner  
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